



Almaden Services Research

Educating the New Service Professional: What are the Essentials of a Service Curriculum?

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Analysis by Xiaoyun (Amanda) Liu

01 Dec 08

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Although more and more universities are interested in developing programs that is focused on SSME, there is no consensus regarding the core of a curriculum. The report provides steps toward a curriculum framework that serves as a strong guidance in services education development while encouraging universities to explore and design their innovative service-based curricula in different contexts and directions

Service jobs are increasingly the **high skill** knowledge worker jobs – especially in business and information services

95% of all business executives and research scientists are alive today.

Type of work system	1979	1996			Example
		All	Service	Manufacture	
High-skill Autonomous	34%	40%	40%	40%	Executive, Scientist
Semi-Autonomous	35%	30%	30%	35%	Admin., Manager
Unrationalized Labor Intensive	25%	25%	26%	15%	Maid, child care
Tightly Constrained	6%	5%	4%	10%	Call center, Fast food

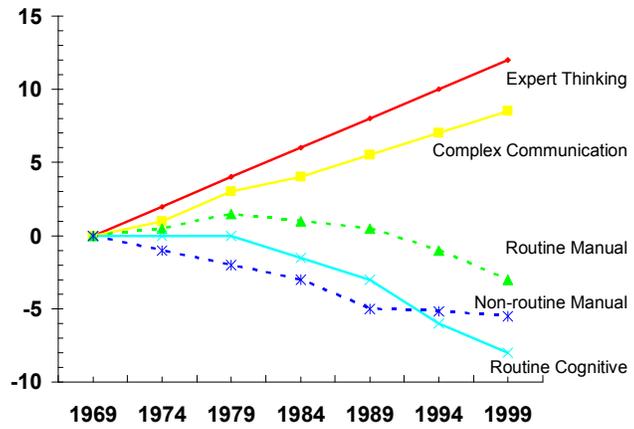
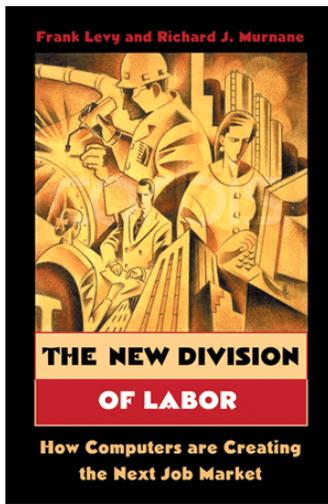
-from Herzenberg, Alic, & Wial (1998). *New rules for a new economy. Employment and opportunity in postindustrial America.* Cornell University Press.

From Herzenberg, Alic, Wial (1998)

Herzenberg et al (1998) confirmed that about 70% of US jobs from 1979 to 1996 were high-skill autonomous and semi-autonomous jobs, and most of the growth was in the high skill area. One way to think about this is to note that about 95% of all business executives and research scientists that have ever lived are alive today.

Stephen A. Herzenberg, John A. Alic, Howard Wial (1998) *New rules for a new economy. Employment and opportunity in postindustrial America.* Cornell University Press.

Jobs and tasks are changing



Based on U.S. Department of Labor' Dictionary of Occupational Titles (DOT)

Levy, F. & Murnane, R. J. (2004). *The New Division of Labor: How Computers Are Creating the Next Job Market*. Princeton University Press.

Tacit Jobs



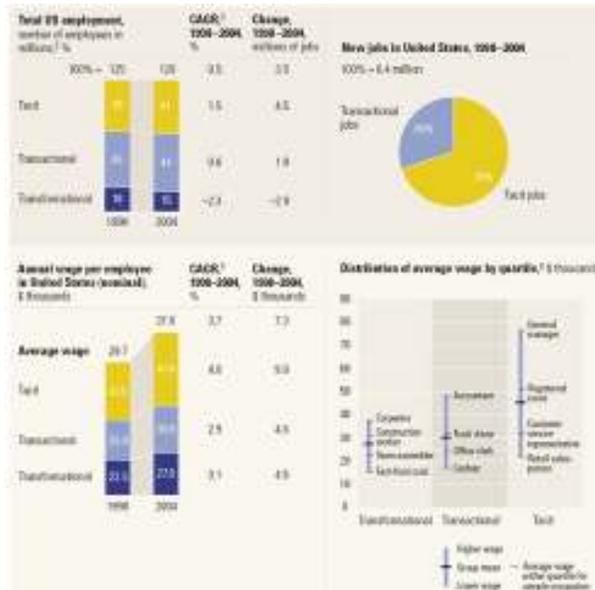
Only about 15% of US workforce are in “transformational jobs, the rest of the workforce now spend most of their time interacting.

Complex interactions require people to deal with ambiguity, exercise high levels of judgment, drawing on deep experience, i.e. tacit knowledge. These people may be salespeople, doctors, consultants.

Routine interactions are referred to as transactional, e.g. clerical, accounting.

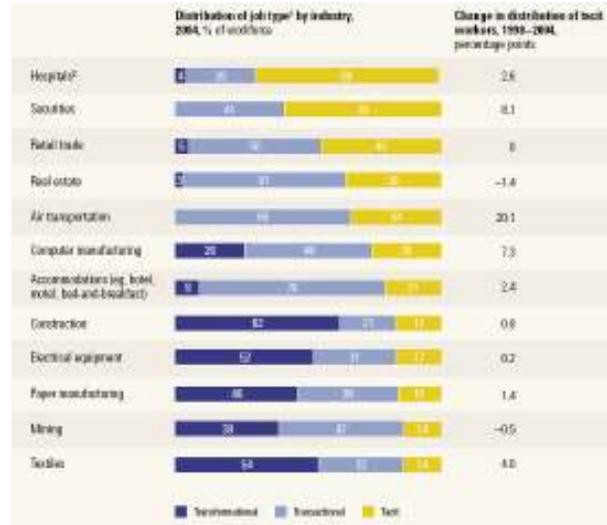
Johnson, B., Manyika, J., & Yee, L. (2005). The next revolution in interactions. *McKinsey Quarterly*, 4, 20-33.

Tacit Job Growth

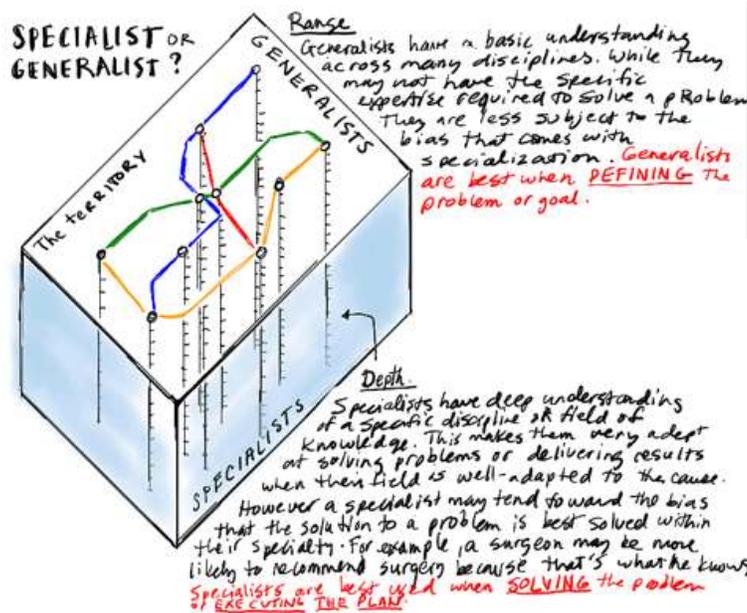


Johnson, B., Manyika, J., & Yee, L. (2005). The next revolution in interactions. *McKinsey Quarterly*, 4, 20-33.

Job Mix



Johnson, B., Manyika, J., & Yee, L. (2005). The next revolution in interactions. *McKinsey Quarterly*, 4, 20-33.



Dave Gray, Founder and Chairman, XPLANE, the Visual Thinking Company
<http://communicationnation.blogspot.com/2007/08/specialist-or-generalist.html>

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SSME Education: Looking Ahead Workshop, Sydney, AU

01 Dec 08

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Generalists have a basic understanding across many disciplines while they may not have the specific expertise required to solve a problem, they are less subject to the bias that comes with specialization. Generalists are best when defining the problem or goal.

Specialists have deep understanding of a specific discipline or field of knowledge. This makes them very adept at solving problem or delivering results when their field is well-adapted to the cause. However, a specialist may tend toward the bias that the solution to a problem is best solved within their specialty. For example, a surgeon may be more likely to recommend surgery because that what he knows. Specialists are best when solving the problem or executing the plan.

dave gray

Gender: Male

Industry: [Communications or Media](#)

Occupation: [Founder and Chairman](#)

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About Me

Founder and Chairman of [XPLANE](#), the visual thinking company.

<http://communicationnation.blogspot.com/2007/08/specialist-or-generalist.html>

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Different Takes on the 'T'

Interactional Expertise



Collins & Evans, 2002
Cardiff University

Breadth of Knowledge



Generalist



Kathleen Carley, CMU.
Computational organization theory
experiments have shown that breadth
improve adaptiveness and performance

Summary of I and T shaped professionals

On I and T shaped professionals, generalists, specialists, interactional expertise, and contributory expertise -- and the needs of the future workforce

I-shaped professionals are deep specialists. Specialist is a synonym for I-shaped people. The world needs them and will always need them. I-shaped does not go away. From a discipline perspective, specialists are said to have "contributory expertise" as they can contribute to the development of the field, and solve the hard problems that the discipline has compiled a body of knowledge to solve.

A generalist is said to have "interactional expertise," so they can talk with someone and understand the terms and concepts, but does not have deep knowledge to solve problems or contribute new knowledge to the field. Generalists are needed to connect specialists (or I-shaped professionals) who might not otherwise talk with each other.

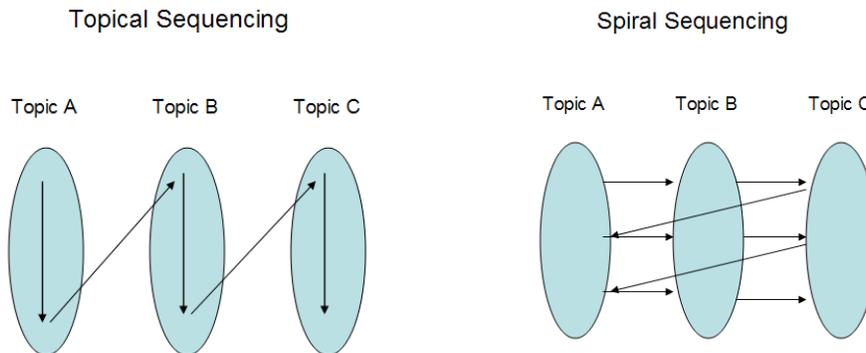
T-shaped professional are deep specialists ("contributory expertise" in their home discipline), but also have "interactional expertise" across a wide range of disciplines and business functions. T-shaped professionals have all the advantages of a I-shaped professional combined with a generalist. T-shaped tend to be rarer than I-shaped. T-shaped tend to be more flexible in working on teams than I-shaped. T-shaped tend to learn new areas faster than I-shaped (though not always, depends on the learning skills of the I-shaped).

Approach

- “Training the New Service Professional: Curriculum Strategy for Service Systems Education” by Xiaoyun (Amanda) Liu
- Asked to answer the question, ‘what should a service education curriculum look like?’
- Two cross-program analyses of current programs
 - Examined 25 universities and 246 courses
 - Semantic analysis (BIW)
 - Domain-based taxonomy

The author conducted two cross-program analyses of current programs. One is structure analysis which examines the emphasis under each field using the semantic analytical tool - Business Insights Workbench (BIW); the other is based on the taxonomy the author created which is from a domain perspective.

Organization of learning content



1.2.2 Two models: topical V.S. spiral model

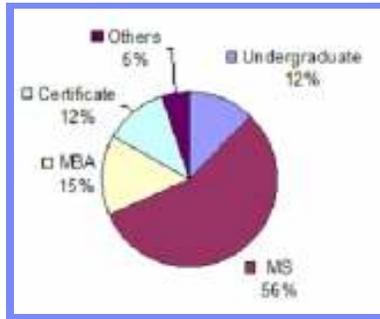
SSME is an interdisciplinary which is composed of several subjects, such as business, engineering, and sociology. Since there is a strong relationship among these subjects, the order for teaching them will impact how well learners master the learning content. Logically organizing the subject matter could help students understand and get the big picture of SSME. A traditional model of teaching multiple disciplines is the topical sequencing (Figure 2). In topical sequencing, “a topic is taught to whatever depth of understanding is required, before moving to the next one” Reigeluth (1999). An advantage is that learners can master one topic deeply without interruption. However, the disadvantage is that learners easily forget the old topics when they move to a new one. And they do not learn the interrelationship among topics.

In spiral sequencing (Figure 3), learners explore the same topics at deepening phases. They start with the basics of each topic and then learn deeper and deeper. Jerome Bruner (1960) coined the concept – spiral curriculum in 1960:

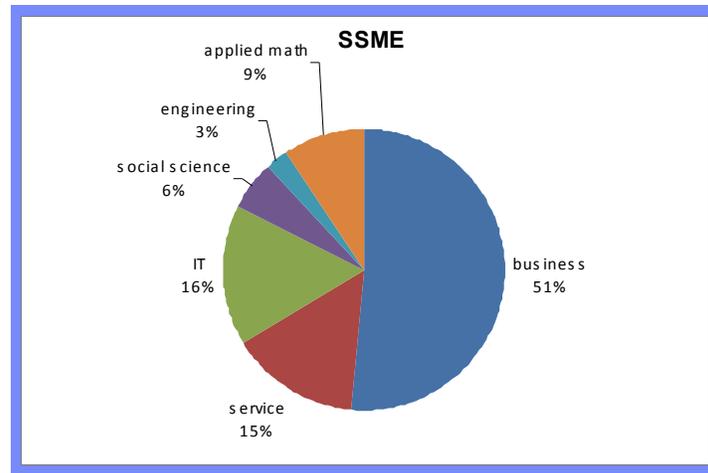
...at some simple level a set of ideas or operations were introduced in a rather intuitive way and, once mastered in that spirit, were then revisited and reconstrued in a more formal or operational way, then being connected with other knowledge, the mastery at this stage then being carried one step higher to a new level of formal or operational rigour and to a broader level of abstraction and comprehensiveness. The end state of this process was eventual mastery of the connexity and structure of a large body of knowledge... (p.88)

Service Science degree distribution

Degrees	Size	Proportion
Undergraduate degree	5	12%
Masters of Science	23	56%
MBA	6	15%
Certificate	5	12%
Other (lecture)	2	5%



Domain analysis



2.3 Domain analysis

To analyze the current programs from a domain perspective, the author created a taxonomy of the essential domains of service science which is listed in Appendix C. Service basically involves 6 domains: business, service, IT, social science, engineering and applied math. Then the author browsed every course description and classified them into each category. As illustrated by Figure 6, business courses are dominant in the exiting SSME programs, followed by courses of IT, service, applied math, social science and engineering.

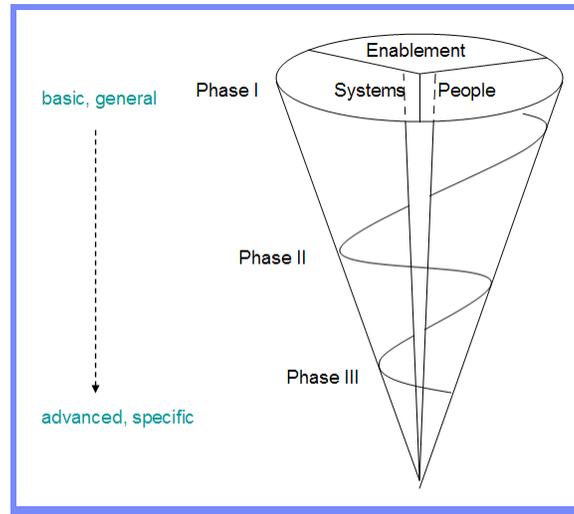
Areas of education associated with SSME

- Manage (27)
- Manage, service operation (26)
- Market (20)
- Project (19)
- Analysis, service market, economy (18)
- Student (16)
- Information (15)
- Performance, quality, product (14)
- Process (14)
- Data (13)
- System, manage (11)
- Base and web (9)
- Service business, budgeting, creativity, communication (6)
- Network (5)
- Develop and concept (5)
- Business (5)
- Service science (5)
- Control (4)
- Human behavior (4)
- Manage, engine knowledge (4)
- Research, account financial (4)
- Decision making & plan (2)

2.2 Structure analysis

Business Insights Workbench (BIW), a solution created by IBM's Almaden Research Center, provides integrated structured and unstructured information mining. The author uploaded the exiting programs data she collected onto IBW. Table 3 is the popular terms associated with "SSME" which are listed from the most to least relevant. It indicates the content overview of current service programs. The table 4, 5, and 6 display co-occurrence analyses between universities and emphases. An obvious feature is that although these universities have some similarities, each has distinct weight that reflects the academic units that provides it.

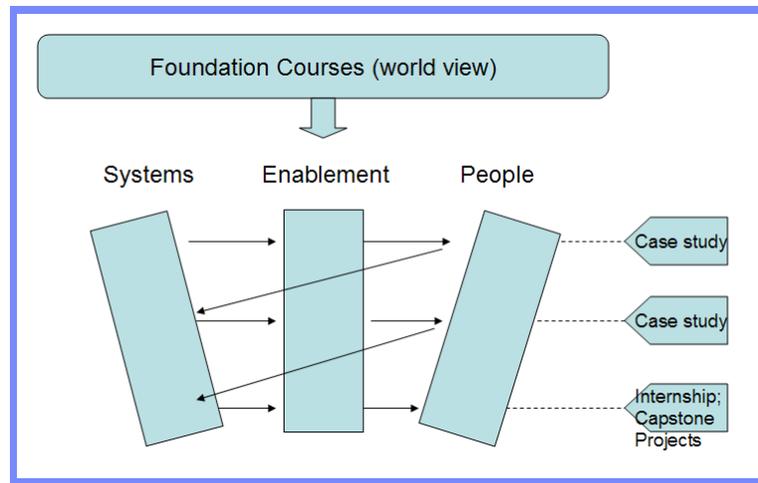
Spiral learning model for SSME curriculum development



To develop the spiral, project-based curriculum, the author **integrates the attributes of a service professional, spiral model, and the cross-program analysis of current programs. Based on the attributes and analysis of current courses, the itemized learning objectives of a service curriculum are identified as systems, enablement and people. Systems are the service infrastructure development and management. Enablement is the technology and tools to facilitate the development and management of systems. People is the interactional skills to manage and communicate among multidisciplinary teams.**

Figure 14 illustrates the framework in details. Learners start the curriculum with the foundation courses where basic skills and concepts are introduced to build the world view of an adaptive innovator. For instance, statistics, overview of service science, management and engineering, basic concepts of services, general description of service systems, SSME challenges, etc. Then they move to the basics of systems, enablement and people in phase 1 of the curriculum. Phase 2 and 3 follow similarly, with learners revisit the same systems in which they learn more complex knowledge and skills building upon what they have acquired about the basics in previous phases. In the last phase, the courses will focus on a specific service system, for instance educational service, transportation service, etc. In the end of each phase, case studies are provided to help learners relate their studies into practice. In the end of the curriculum, students individually participate in a capstone project or an internship in a service organization supervised by a faculty. Appendix D compares the three models: domain-centric model, life-cycle model, and spiral and project-based model.

Delivering knowledge from general to more specific in the areas of systems, enablement, and people.



4.1 SSME Curriculum framework

The author anticipates that the new curriculum framework could be applied in to real world in the current universities. Figure 15 presents an example of spiral and project based model. Universities and other educational institutes are encouraged to develop their innovative service-based curricula in different contexts and directions, because they have unique faculty, resources, and academic emphasis. The following recommendations are offered for an appropriate use of the spiral and project based framework.

The foundation courses enable learners develop a service mindset. These courses should be team-taught by experts from various functional areas so that different perspective can be presented to the students. A good case in point is a course titled “Information and Service Economy” in UC Berkeley. It is a foundation course for their master’s level Information and Service Design program. Two professors participated in teaching the course: Robert Glushko, a cognitive scientist, software engineer, and AnnaLee Saxenian, an economist and political scientist. Students could understand service science from both perspectives.

The framework emphasizes the use of case studies and capstone projects because they could help students to go beyond factual recall to an application of knowledge and skills in real-time. In the case studies of the first two phases, students work in teams. The groups are assigned at random with adjustments aimed at distributing the students of diverse background evenly across the groups. In other words, groups are encouraged to be formed by students with different background. For instance, have learners from economics, engineering, information science, marketing, and social science cooperatively work on a case study. During the collaboration, they will unconsciously learn how to perform communication across disciplines which is one of essential skills of a T-shaped professional. The case studies will be more and more complex which needs more decentralized decision making in a service system as students learn more advanced knowledge and skills. IBM Global Business Services[1] offers case studies examples which could be searched both by industry and by business function.

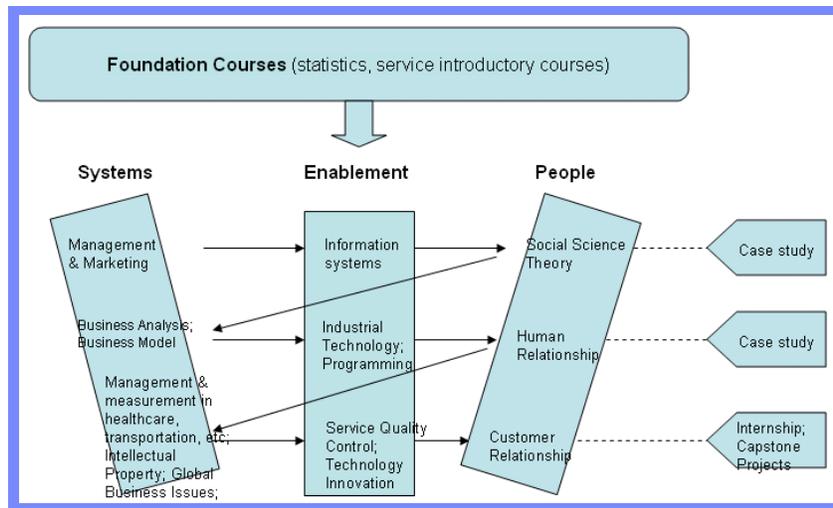
The curriculum delivers knowledge from general to more specific in the areas of systems, enablement, and people. Universities are encouraged to invite experts across disciplines and form a committee to design the curriculum together. They could decide the basic and advanced knowledge, and the case studies in each phase.

Service science could be taught in hybrid learning environment in universities. Hybrid learning blends classroom and online learning, allowing synchronous and asynchronous interactions. The Internet enables students gain the ownership of learning. Students will be able to learn what they want when they want it. Learners will learn better than what they do in traditional classroom settings because they can have the primary authorities at their fingertips and more attention, interaction, and feedback. Online learning could provide diverse learning opportunities for critical thinking skills, problem solving skills, and enable both individual-directed and group-oriented learning activities, which are essential for service science education. IBM has created “Rehearsal Studio”[2], a virtual world designed to help learners practice high-level skills, such as client relationships, collaboratively with their teammates. Given various scenarios, participants could use avatars to perform tasks and test their judgment.

[1] http://www-935.ibm.com/services/us/gbs/bus/html/bcs_casestudies.html

[2] <http://www.ibm.com/virtualworlds/>

Curriculum framework



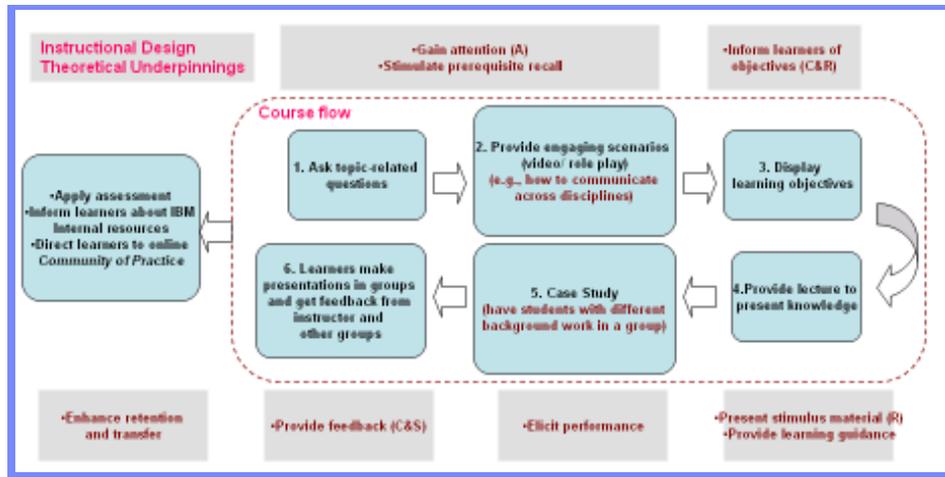
4.2 SSME training framework

The author has also designed a SSME framework from a training perspective which is illustrated in figure 16. It could be applied to both face-to-face workshop and online training. The framework has the following features.

Modularity. SSME training could be separated into several sessions/ modules with a different area of service science in each session. The course architecture could be adapted to each session. The component material populating each module will be a discrete unit that may be created, inserted, adapted, deleted or replaced at the will of IBM upper management. The first six steps in the dashed line are for each module.

Peer Interactions – A well-designed peer community-of-practice exposes service professionals to far more learning scenarios than could ever be developed by a design team, and they will be completely realistic, since they are in fact real. These questions are also saved and archived so that the number of cases is constantly increasing. Young and new supervisors can be scaffolded by older, more experienced service professionals. After learners finish all the models in the end of training, they could have an overall assessment, and be introduced to internal resources and community-of-practice.

SSME Framework





Thank you

Engagement and effectiveness

- Gagne's Nine Events of Instruction (1992):
 1. Gaining attention (reception)
 2. Informing learners of the objective (expectancy)
 3. Stimulating recall of prior learning (retrieval)
 4. Presenting the stimulus (selective perception)
 5. Providing learning guidance (semantic encoding)
 6. Eliciting performance (responding)
 7. Providing feedback (reinforcement)
 8. Assessing performance (retrieval)
 9. Enhancing retention and transfer (generalization)
- ARCS (Keller, 1988):
 1. Gain Attention: Arouse and sustain curiosity and attention
 2. Provide Relevance: Connect instruction to important needs and motives
 3. Create Confidence: Generate positive expectancies
 4. Generate Satisfaction: Keep control under control

Effectiveness. The framework is based on several sound instructional theories, and uses different approaches to handle different needs. The over-arching theoretical foundational model is Gagne's Nine Events of Instruction (Gagne, 1992). We believe that all subsequent models have some similarity to or are merely elaborations on this model, and so while we may employ bits of other models, we suggest that the Nine Events are the basic building blocks of all instruction. Using a unified and consistent application of this model helps to develop a "groove" that the learners can get into, providing the feeling of seamlessness.

The Nine Events are outlined as follows (Gagne, 1992):

1. Gaining attention (reception)
2. Informing learners of the objective (expectancy)
3. Stimulating recall of prior learning (retrieval)
4. Presenting the stimulus (selective perception)
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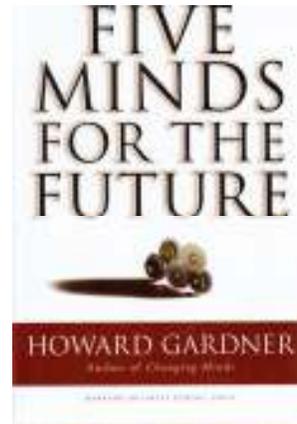
One missing link in the Nine Events is motivation, which is why we have included Keller's ARCS model. We don't want the service professional to be motivated just by the assessments, but because they actually want to learn this stuff. We provide moments of motivation throughout our course design to maintain engagement.

ARCS (Keller, 1988) refers to:

1. Gain Attention: Arouse and sustain curiosity and attention
2. Provide Relevance: Connect instruction to important needs and motives
3. Create Confidence: Generate positive expectancies
4. Generate Satisfaction: Keep control under control

Five Minds for The Future

- **Disciplined Mind**
has mastered at least one way of thinking
- **Synthesizing Mind**
takes information from disparate sources...and makes sense of it for self and others
- **Creating Mind**
breaks new ground
- **Respectful Mind**
seeks to work effectively with diversity
- **Ethical Mind**
works for more than self-interest and improves the quality of life for all



Howard Gardner (2006), Five Minds For The Future, Harvard Business School Press.

What "minds" does Gardner say you need to master?

1)The disciplined mind. Learn at least one discipline --- a ten-year process --- or you're "destined to march to someone else's tune."

“...has mastered at least one way of thinking – a distinctive mode of cognition that characterizes a specific scholarly discipline, craft, of profession.”

2)The synthesizing mind. As information floods in, you need to connect, understand and evaluate information from disparate sources.

“...takes information from disparate sources, understands and evaluates that information objectively, and puts it together in ways that make sense to the synthesizer and also to other persons.”

3)The creating mind. So you can break new ground.

“... breaks new ground. It puts forth new ideas, poses unfamiliar questions, conjures up fresh ways of thinking, arrives at unexpected answers.”

4)The respectful mind. "Intolerance or disrespect is no longer an option."

“...notes and welcomes differences between human individuals and between human groups, tries to understand these “others”, and seeks to work effectively with them.”

5)The ethical mind. So you can work for more than self-interest and improve the quality of life for all.

“...ponders the nature of one’s work and the needs and desires of the society in which one lives...serve purposes beyond self-interest...work unselfishly to improve the lot of all.”